Amendments to the Specification

Replace the paragraph beginning on page 2, line 31 with the following amended paragraph:

The invention provides a transition metal-substituted cobalt ferrite magnetostrictive material that provides a reduction in hysteresis. The cobalt ferrite is doped with manganese (Mn) (or aluminium Al or ~~other~~ transition elements such as chromium Cr, zinc Zn, ~~aluminium Al,~~ or copper Cu or mixtures thereof) by substituting Mn (or Cr, Zn, Al, or Cu or mixtures thereof) for iron or cobalt to form manganese-substituted cobalt ferrite (or other transition metal-substituted cobalt ferrite) that provides mechanical properties that make the substituted cobalt ferrite material effective for use as sensors and actuators. The Mn (or Cr, Zn, Al, or Cu or mixtures thereof) lowers the Curie temperature of the material while maintaining a suitable magnetostriction for stress sensing applications

Replace the paragraph beginning at page 8, line 11 with the following amended paragraph:

From the foregoing, it can be seen that manganese-substituted cobalt ferrites offer improved scope for developing magnetomechanical sensors and actuators beyond that possible with the original cobalt ferrite material. Substitution of Mn for Fe has the effect of making a substantial decrease in Curie temperature, which should have a substantial effect on the temperature dependence of magnetic and magnetomechanical properties contributing to magnetomechanical hysteresis. The maximum magnetostriction magnitude, although decreased, is still sizeable, and is more than sufficient for use as a magnetomechanical stress sensing material for many applications. The saturation magnetization, upon which the magnitude of the external field used in non-contact sensing will depend, shows only a modest decrease throughout the compositional range. Similarly, the slope of the magnetostriction curve at low field, upon which the sensitivity for stress sensing applications will depend, is higher for manganese-substituted cobalt ferrites $CoFe_{2-X}Mn_XO_4$ with manganese content up to $x = 0.3$. As a result, it should be possible to adjust the temperature dependence of magnetomechanical hysteresis while still maintaining sufficient magnetomechanical sensor material performance. The substituted cobalt ferrite material may be created without using any binder, with either the metal or organic binders, or with both of the metal and organic binders. The approach to use depends on the desired material properties. Metal–substituted cobalt ferrite using Mn, Cr, Zn, Al, or Cu ~~or other transition metals~~ or mixtures thereof, could also give the desired material properties.

Replace the paragraph beginning at page 8, line 30 with the following amended paragraph:

The effects of composition on the magnetic and magnetomechanical properties of cobalt ferrite substituted with manganese have been described. The Curie temperature of cobalt ferrite can be reduced over a substantial range by the substitution of Manganese for Ferrite. The fact that the Curie temperature and magnetostriction of manganese-substituted cobalt ferrite are selectable by adjusting manganese content allows the material properties to be optimized for use as stress sensors over a range of operational temperatures. Metal–substituted cobalt ferrite using Mn, Cr, Zn, Al, or Cu ~~or other transition metals~~ or mixtures thereof, with or without Mn could also allow the material properties to be optimized for use as stress sensors over a range of operational temperatures.